M011: BELAY TECHNIQUES

TSP Number/Title	M011: Belay Techniques
Effective Date	Implement next class iteration upon receipt
Supersedes TSP(s)/Lessons	None
TSP User	The following courses use this TSP: Mountain Instructor Qualification Course (MIQC) Basic Mountaineering Course (BMC) Assault Climber Course (ACC)
Proponent	United States Army Alaska, Northern Warfare Training Center
Improvement Comments	Send comments and recommendations on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to: ATTN: TRAINING ADMINISTRATOR COMMANDANT USARAK NWTC 1060 GAFFNEY ROAD #9900 FORT WAINWRIGHT AK 99703-9900
Security Clearance/Access	Public domain
Foreign Disclosure Restrictions	The Lesson Developer in coordination with the USARAK NWTC foreign disclosure authority has reviewed this lesson. This lesson is releasable to foreign military students from all requesting foreign countries with Approval of Commandant USARAK NWTC.

PREFACE

Purpose

This training support package provides the instructor with a standardized lesson plan for presenting instruction for:

Task Number	Task Title
VIII.0600	Belay Techniques

Technique of Delivery

Lesson Number	Instructional Strategy	Media
M011	Demonstration and Practical Exercise	None

This TSP contains

SECTION I **ADMINISTRATIVE DATA**

All courses including this lesson

Course Number	Course Title
NA	Mountain Instructor Qualification Course
NA	Basic Mountaineering Course
NA	Assault Climber Course

Task(s) Taught or Supported

Task Number	Task Title
VIII.0600.A	Demonstrate rope management procedures for belaying
VIII.0600.B	Explain rope commands
VIII.0600.C	Perform a hip (body) belay
VIII.0600.D	Perform a mechanical (munter hitch belay)
VIII.0600.E	Perform a mechanical belay
VIII.0600F	Perform a boot ax belay
VIII.0600.G	Perform a running belay
VIII.0600.H	Establish a belay for top rope climbing
VIII.0600.I	Establish a belay for lead climbing
VIII.0600.J	Perform a belay escape

Task(s) Reinforced

Task Number	Task Title
VI.0200	Risk Management for Mountain Operations
VIII.0300	Rope management and Knots
VIII.0400	Anchors
VIII.0500	Climbing
VIII.0700	Roped Climbing

Test Lesson Number

Hours	Lesson Number	Lesson Title
	M020/M021/M022	BMC Mountaineering Review/ACC Mountaineering Review/MIQC Mountaineering Review

Prerequisite Lesson(s)

-M005, Risk Management for Mountain Operations
-M007, Mountaineering Equipment
-M008, Rope Management and Knots
-M009, Anchors
-M012, Tie into the climbing Rope

References

Number	Title	Date	Additional Information
	NWTC Mountain Operations Manual	FY04	Updated yearly
FM 3-97.6	Mountain Operations	November 2000	http://www.adtdl.army.mil/
FM 3-97.61	Military Mountaineering	August 2002	http://www.adtdl.army.mil/

Student Study Assignment

Read TSP M011

Instructor Requirements

MIQC graduate, TAITC graduate

Additional Support

None

Personnel Requirements

Equipment Required

Instructor Equipment.

- Helmet
- 1 x rope, dynamic kernmantle, 11mm x 50m
- 2 x webbing, nylon 1” x 5.5 ft
- 2 x webbing, nylon 1” x 9.5 ft
- 2 x webbing, nylon 1” x 25 ft
- 1 x carabineer, locking pear shaped
- 4 x carabineer, non-locking, oval steel
- Figure-8 device
- Tuber style belay device
- Artificial protection

Student Equipment.

- 1 x rope, dynamic kernmantle, 11mm x 50m
- 2 x webbing, nylon 1” x 5.5 ft
- 2 x webbing, nylon 1” x 9.5 ft
- 2 x webbing, nylon 1” x 25 ft
- 1 x carabineer, locking pear shaped
- 4 x carabineer, non-locking, oval steel
- Pen and notepad

Materials Required

Instructor Materials:

- NWTC Mountain Operations Manual
- Risk Management for Mountain Operations

Student Materials:

- NWTC Mountain Operations Manual
- Risk Management Guide for Mountain Operations

Classroom, Training Area and Range Requirements

Mountaineering training/testing area large enough to facilitate 8 students working in pairs and SGL. Training area must have adequate routes to facilitate installation of a belay.

Ammunition Requirements

None

Instructional Guidance

Before presenting this lesson, instructors must thoroughly prepare by studying this lesson and identified reference material.

Branch Safety Manager Approval

NAME	Rank	Position	Date
Mark Gilbertson	**GS-09**	**Training Specialist**	

Proponent Lesson Plan Approvals

NAME	Rank	Position	Date
Peter Smith	**GS-12**	**Training Administrator**	

SECTION II **INTRODUCTION**

Method of instruction: Small Group
Type of instruction: Class and Practical Exercise
Instructor to student ratio: 1:8
Time of instruction: 2 Hours
Media used: None

Motivator

The climber's margin of safety is increased on difficult exposed terrain by tying in to the climbing rope and moving as a member of a rope team. On steep terrain, simultaneous roped movement only helps to ensure that if one climber falls, he will have company on the way down as the rope jerks the other rope team member off the slope. If the climbing rope is to be of any value on steep rock climbs, the rope team must incorporate "belays" into the movement.

Belaying is a method of managing the rope in such a way that, should one person take a fall, the fall can be halted or arrested by another rope team member. One person climbs at a time, while being belayed from above or below by another. The belayer manages the rope so that friction, or a brake can be applied to halt a fall. Belay techniques are also used to control the descent of personnel and equipment on fixed rope installations, and for additional safety on rappels and stream crossing.

Terminal Learning Objective

ACTION:	Demonstrate establishment of and execution of different types of belays utilized in roped climbing
CONDITION:	Given an area with suitable features for establishing a belay, adequate sling materials, carabineers, appropriate artificial protection and a dynamic climbing rope
STANDARD:	Demonstrate establishment of and execution of different types of belays utilized in roped climbing IAW the NWTC Mountain Operations Manual.

Safety Requirements

Ensure that students:

- Receive a risk assessment prior to movement to the training area and before practical exercises.
- Have all necessary equipment for the PE's, to include any additional equipment required by the NWTC SOP.
- Have two full canteens and drink adequate water to avoid becoming dehydrated.
- Receive a briefing on the symptoms of heat injury or cold weather injury, as appropriate.

Risk Assessment Level

Determined by instructor.

Environmental Consideration

None

Evaluation

You will be evaluated on this task during the Mountain Stakes portion of training as per the NWTC training schedule for this course.

Instructional Lead-in

You have already mastered the skills of rope management and knots, constructing anchors and tying in to the climbing rope. You will now use a combination of these skills to learn how to properly set up a belay.

SECTION III **PRESENTATION**

ELO A

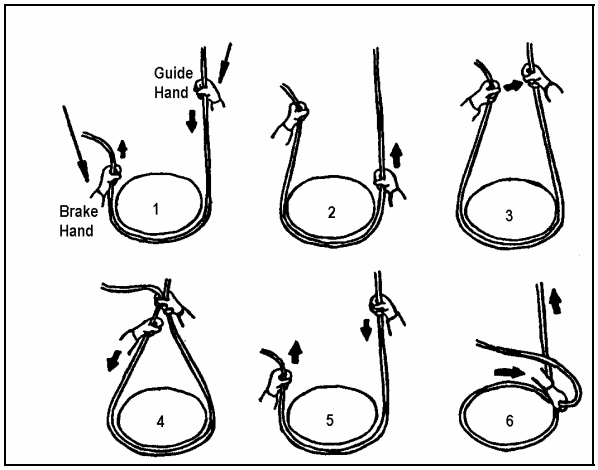
ACTION:	Demonstrate rope management procedures for belaying
CONDITION:	Given a dynamic climbing rope
STANDARD:	Demonstrate rope management procedures for belaying IAW the NWTC Mountain Operations Manual.

Learning Step/Activity 1 - Rope Management

a. To properly manage the rope for belaying the belayer must be able to perform 3 basic functions:
1. GIVE: Manipulate the rope to give the climber slack during movement.
2. TAKE: Take up rope to remove excess slack
3. BRAKE: Apply brake to halt a fall

b. The belayer must be able to perform all 3 functions while maintaining "total control" of the rope at all times. Total control means the brake hand is NEVER removed from the rope. Taking and giving rope, however, requires a certain technique to insure the brake hand remains on the rope at all times.

c. Demonstration and execution of GIVE, TAKE and BRAKE (Note: The instructor should lay a dynamic rope out into a circle large enough to accommodate himself and all students):
1. Grasping the rope with both hands, place it behind the back and around the hips. The hand on the section of the rope between the belayer and the climber would be the guide hand. The other hand is the brake hand.
2. Take in rope with the brake hand until the arm is fully extended. The guide hand can also help to pull in the rope.
Holding the rope in the brake hand, slide the guide hand out, extending the arm so the guide hand is farther away from the body than the brake hand.
3. Grasp both parts of the rope, to the front of the brake hand, with the guide hand.
4. Slide the brake hand back towards the body.
5. Repeat the step above. The brake can be applied at any moment during the procedure. It is applied by wrapping the rope around the front of the hips while increasing grip with the brake hand.
6. When giving slack, the rope simply slides through the grasp of the brake hand, at times being fed to the climber with the other "feeling" or guide hand.



ELO B

ACTION:	Explain rope commands
CONDITION:	In a field environment, given a basic belay that has already been installed to standard
STANDARD:	Explain rope commands IAW the NWTC Mountain Operations Manual.

Learning Step/Activity 1 - Rope Commands

a. A series of standard voice commands were developed over the years to signal the essential rope management functions in a belayed climb. Each command is concise and sounds a bit different from another to reduce the risk of a misunderstanding between climber and belayer. They must be pronounced clearly and loudly so they can be heard and understood in the worst conditions. The chart shows a conversation between belayer and climber with commands in capital letters and actions taken in lower case.

BELAYER	**CLIMBER**	**Meaning**
BE-LAY ON		The belay is on, you may climb when ready, the rope will be managed as needed
	CLIMBING	I am ready to climb
CLIMB (as a courtesy)		Proceed, and again, the rope will be managed as necessary
ROCK	ROCK	Protect yourself from falling objects. Signal will be echoed by all climbers in the area. If multi-pitch climbing, ensures climbers below hear.
Takes in rope	TAKE ROPE	Take in excess rope between us without pulling me off the route
Removes brake/tension	SLACK	Release all braking/tension on the rope so I can have slack without pulling the rope
Removes slack, applies brake	TENSION	Take all the slack, apply brake and hold me. My weight will be on the rope
Applies brake to arrest the fall	FALLING	I am falling
TWEN-TY-FIVE	Selects a belay position	You have app. 25ft. of rope left, start looking for next belay position
FIF-TEEN	Select a belay within the next few feet	You have about 15 ft. of rope left
FIVE	Set up a belay	You have about 5 ft. of rope left, set up the belay position. You have no more rope
Removes the belay, remains anchored, prepares to climb	OFF-BELAY	I have finished climbing and I am anchored. You may remove the belay.

b. Rope Tug Commands. Sometimes the loudest scream cannot be heard when the climber and belayer are far apart. This is especially true in windy conditions, or when the climber is around a corner, above an overhang, or at the back of the ledge. While climbing, the most important command is BELAY ON. For a rope tug command, the belayer issues three distinct tugs on the rope to signal BELAY ON.

ELO C

ACTION:	Perform a hip (body) belay
CONDITION:	In a field environment, given an adequate area, dynamic climbing rope, sling material, and carabiners
STANDARD:	Perform a hip (body) belay IAW the NWTC Mountain Operations Manual.

Learning Step/Activity 1 – Belay Fundamentals

a. Belay concept. A belay is used to allow movement over difficult terrain with a greater margin of safety. If two individuals must scale a rock face (or any steep, vertical slope or overhanging), the proper use of belay techniques can prevent or minimize the hazard should an individual take a fall while moving up that rock face. Two climbers tie into the ends of the rope. One individual must scale the rock face first. This is generally the strongest climber in the group. This individual will be belayed by another individual as he moves up the rock face. This is known as lead climbing and is discussed later in this TSP. For now, assume that you are the strongest climber and you have already made it to the top of the rock face. It is now up to you to belay the other member of your team up the rock face. You will provide a safety line as the climber moves up the rock face. This is also known as a top belay.

b. There are five steps to remember when setting up any belay:

1. Position and Stance. Once the climbing line is picked, the belayer selects his position. The position should allow the belayer to maintain a comfortable, relaxed stance, as he could be in the position for a fairly long time. Large ledges that allow a well braced, sitting stance are preferred. Look for belay positions close to bombproof natural anchors.

2. Aim the Belay. With the belay position selected, the belay must now be "aimed". The belayer figures out where the rope leading to the climber will run and which direction the force of a fall will likely come from.

3. Anchor the Belay. For a climbing belay to be considered bombproof, the belayer must be attached to a solid anchor(s) capable of withstanding the highest possible fall force. A solid natural anchoris ideal. Each anchor must be placed in line with the direction of pull it is intended to support. The attachment between the anchor and the belayer must be inline and snug to support the stance. Both belayer's stance and belay anchors should absorb the force of a fall. The belayer can use either a portion of the climbing rope or slings of the appropriate length to connect himself to the anchors. It's best to use the climbing rope whenever possible, saving the slings for the climb. The rope is attached using either figure eight loops or clove hitches. Clove hitches have the advantage of being easily adjusted. If the belayer has to change his stance at some point, he can reach back with the guide hand and adjust the length of the attachment through the clove hitch as needed.

4. Stack the Rope. Once the belayer is anchored into position, he must stack the rope to ensure there is no slack between the climber and the belayer. When all of the slack is removed, the climber should sound off with "*THAT'S ME".* The rope should be stacked on the ground, or on the ledge. The rope should never be allowed to hang down over the ledge.

5. Attach the Belay. The final step of the procedure is to attach the belay. The belayer should make one quick, final inspection of his belay. When the belayer is satisfied with his position, he gives the signal, "*BELAY ON*!".

Learning Step/Activity 2 – Seated Hip/Body Belay

a. A hip/body belay uses friction between the rope and the clothed body as the rope is pressured across the clothing.
The belayer must ensure he is wearing adequate clothing to protect the body from rope burns when using a body belay. Heavy duty leather or cotton work gloves can also be worn to protect the hands.

b. Seated Hip/Body Belay. The seated hip belay is used to move personnel up a route that is less than vertical, but is difficult or exposed enough to warrant the protection of a belay. The steps are as follows:

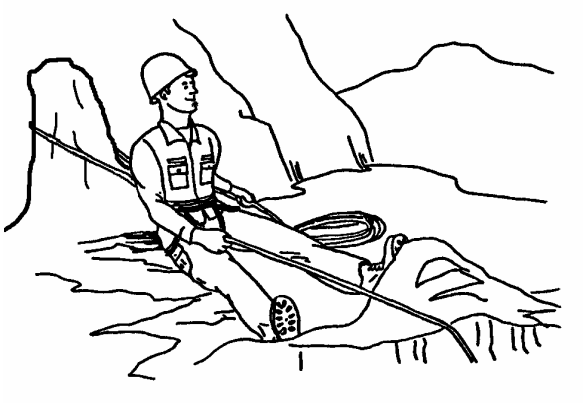
1. Position and Stance and Aim: The belayer sits facing the direction where the force of a fall will likely come from and uses terrain to his advantage, attempting to brace both feet against the rock to support his position. It's best to sit in a slight depression, placing the buttocks lower than the feet, straightening the legs for maximum support. When perfectly aligned, the rope running to the climber will pass between the belayer's feet, and both legs will equally absorb the force of a fall.

2. Anchor: Choose a bombproof natural terrain feature and use the drape, wrap or girth method to establish the anchor. Attach the carabiner from the anchor directly to the improvised seat harness, ensuring that the carabiner is attached to all of the waist straps on the seat harness.

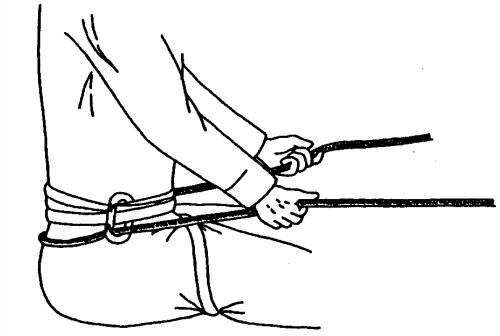
3. Stack the rope until all of the slack is removed between the belayer and the climber, (you should hear *"THAT'S ME"* from the climber).

4. Place the rope coming from the climber around the lower back. Your brake hand should be on the same side as the stacked rope (simply switch the stacked rope to the opposite side if you want/need that to be your brake hand. Place an oval carabiner into all portions of the waist straps on the guide hand side (gate up and away from your body). Clip the rope into the carabiner. This is the guide hand carabiner and will prevent the rope from slipping up and over your head during braking.

5. Inspect the system. Ensure you are inline with the climber and that there is no slack between you and the anchor (snug). Ensure that the gate opens up and away from the anchor and that the anchor is attached to all portions of your waist strap. Enusre that the guide hand carabiner is installed and that the rope runs from the stacked pile, around your back, through the guide carabiner, and to the climber. When you are satisfied sound off with *"BELAY ON".*



SEATED BODY BELAY



"GUIDE CARABINER" FOR
ROPE CONTROL IN A BODY BELAY

Learning Step/Activity 3 – Extended Seated Hip/Body Belay

a. It may be necessary to extend the belay out to a ledge, in order to communicate with your climber, or to get a more stable comfortable position etc. The steps for this are as follows:

1. Position and Stance and Aim: The belayer sits facing the direction where the force of a fall will likely come from and uses terrain to his advantage, attempting to brace both feet against the rock to support his position. It's best to sit in a slight depression, placing the buttocks lower than the feet, straightening the legs for maximum support.

2. Anchor: Choose a bombproof natural terrain feature and use the drape, wrap or girth method to establish the anchor. Using the rope running from your harness, tie a clove hitch and attach it to the anchor carabiner. Adjust the length of rope between you and the carabiner to get to the desired position and stance. The rope will run from your harness around one of your hips to the anchor.

3. Stack the rope until all of the slack is removed between the belayer and the climber, (you should hear *"THAT'S ME"* from the climber).

4. Place the rope coming from the climber around the lower back. Your brake hand should be on

the opposite side from the rope that runs from your harness to the anchor. This will ensure that you are inline with the force of the fall. Your brake hand should be on the same side as the stacked rope (simply switch the stacked rope to the opposite side if you want/need that to be your brake hand). Place an oval carabiner into all portions of the waist straps on the guide hand side (gate up and away from your body). Clip the rope into the carabiner. This is the guide hand carabiner and will prevent the rope from slipping up and over your head during braking.

5. Inspect the system. Ensure that the rope runs from the anchor through the guide carabiner, to the climber in a straight line to prevent from being rotated out of position. Also ensure that there is no slack between you and the anchor (snug). Ensure that the gate opens up and away from the anchor and that the clove hitch is properly tied. When you are satisfied sound off with *"BELAY ON".*

Learning Step/Activity 4 - Standing Hip/Body Belay

a. The standing body belay is used on smaller ledges where there is no room for the belayer to sit. What appears at first to be a fairly unstable position can actually be quite secure ***when belay anchor is placed at or above shoulder height*** to support the stance when the force will be downward.

b. If a body belay is to work effectively, the belayer must ensure that the rope runs around the hips properly, and remains there under load when applying the brake. The rope should run around the narrow portion of the pelvic girdle, just below the bony highpoints of the hips. If the rope runs too high, the force of a fall could injure the belayer's midsection and lower rib cage. If the rope runs too low, the load may pull the rope below the buttocks, dumping the belayer out of position. It is also possible for a strong downward pull to strip the rope away from the belayer, rendering the belay useless. To eliminate any of these possibilities, the belay rope is clipped into a carabiner attached to the guidehand side of the seat harness. This "guide carabiner" helps keep the rope in place around the hips and prevents loss of control in downward loads.

ELO D

ACTION	Perform a mechanical (munter hitch belay)
CONDITION	In field environment, given an adequate area, sling material, oval carabineers, a pear shaped carabineer, and a dynamic climbing rope.
STANDARD	Perform a mechanical (munter hitch belay) IAW the NWTC Mountian Operations Manual.

Learning Step/Activity 1 - Munter Hitch

a. The Munter hitch, when used in conjunction with a pear-shaped locking carabiner, is used to form a mechanical belay and can be used for all climbing applications. It is imperative to use a mechanical belay whenever there is potential for the lead climber to take a severe fall. The holding power of a belay device is vastly superior to any body belay under high loads, however rope management in a mechanical belay is more difficult to master and requires more practice. For the most part, the basic body belay should be totally adequate on a typical military route, as routes used during military operations should be the easiest to negotiate.

b. Steps:

1. Position and Stance and Aim: The belayer sits facing the direction where the force of a fall will likely come from and uses terrain to his advantage, attempting to brace both feet against the rock to support his position. It's best to sit in a slight depression, placing the buttocks lower than the feet, straightening the legs for maximum support. When perfectly aligned, the rope running to the climber will pass between the belayer's feet, and both legs will equally absorb the force of a fall.

2. Anchor: Choose a bombproof natural terrain feature and use the drape, wrap or girth method to establish the anchor. Attach the carabiner from the anchor directly to the improvised seat harness, ensuring that the carabiner is attached to all of the waist straps on the seat harness. You can also extend the belay out in the same manner as the extended hip/body belay.

3. Stack the rope until all of the slack is removed between the belayer and the climber, (you should hear *"THAT'S ME"* from the climber).

4. Attach a pear shaped carabiner to the front of the improvised seat harness. The pear shaped carabiner is inserted around all waist straps and the cross strap and should open up and away from the body. Tie the Munter Hitch:

a. Hold the rope going to the climber in both hands, palms down about 12 inces apart.

b. With the right hand, form a loop away from the body toward the left hand. Hold the loop with the left hand.

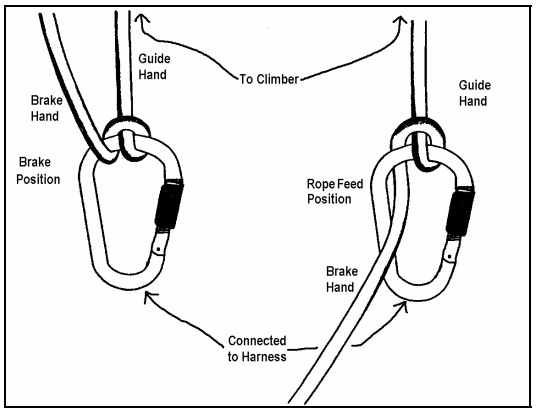
c. With the right hand, place the rope that comes from the bottom of the loop over the top of the loop.

d. Place the bight that has just been formed around the rope into the pear shaped carabiner. Lock the locking mechanism.

5. Inspect the system. Ensure you are inline with the climber and that there is no slack between you and the anchor (snug). Ensure that the gate opens up and away from the anchor and that the anchor is attached to all portions of your waist strap. Enusre the Munter Hitch his tied properly and that the gate is locked. When you are satisfied sound off with *"BELAY ON".*

c. To belay:

1. The Munter hitch is a two-way friction hitch. The Munter hitch will flip back and forth through the pear shaped carabiner as the belayer switches from giving slack to taking up rope. The Munter hitch will automatically brake under load as the brake hand grips the rope. The brake is increased by pulling the slack rope away from the body, towards the load. The belayer must be aware that flipping of the hitch does not change the function of the hands. The hand on the rope running to the climber, or load, is always the guide hand.



MUNTER HITCH

ELO E

ACTION	Perform a mechanical belay
CONDITION	In field environment, given an adequate area, a figure eight device, tuber style belay device, dynaminc climbing rope, sling material, and locking carabineer
STANDARD	Perform a mechanical belay IAW the NWTC Mountain Operations Manual.

Learning Step/Activity 1 - Figure Eight Device

a. The figure eight device is a very versatile piece of equipment and, though developed as a rappel device, has become widely accepted as a very effective mechanical belay device. The advantage of any mechanical belay is friction required to halt a fall is applied to the rope through the device, rather than around the belayer's body. The main principle behind the figure eight device in belay mode is the friction developing on the rope as it reaches and exceeds the 90 degrees angle between the rope entering the device and leaving the device.

b. The principles of the hip/body and munter hitch belay apply to this mechanical belay as well. To use the device, a bight is placed into the climbing rope, is run through the small eye of the device and attached to a locking carabineer at the front of the belayer's harness. A short, small diameter safety rope is used to connect the large eye of the figure eight to the locking carabineer for control of the device. The guide hand is placed on the rope running to the climber. Rope management is performed as in body belay. The brake is applied by pulling the slack rope in the brake hand towards the body, locking the rope between the device and the carabineer.

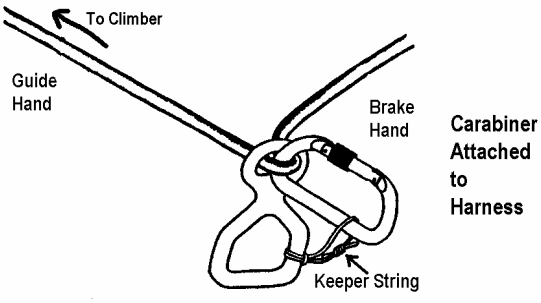


FIGURE 8 BELAY

Learning Step/Activity 2 - The Tuber Style Belay Device

a. There are many other commercially available mechanical belay devices. Some of these devices are the ATC (Air Traffic Controller), slotted plate, (sometimes called a stitch plate) and other tuber devices made in many different shapes. These all work using the same principle as the figure eight device: friction increases on the rope as it reaches and exceeds the 90 degree angle between the rope entering the device and leaving the device.

b. The principles of the hip/body and munter hitch belay apply to this mechanical belay as well. For each device the manufacturers directions should be followed. In general, a placed in the climbing rope is passed through the device and attached to a locking carabiner at the front of the belayer's harness. The guide hand is placed on the rope running to the climber. Rope management is performed as in the body belay. The brake is applied by pulling the slack rope in the brake hand towards the body, locking the rope between the device and the carabiner.

ELO F

ACTIION	Perform a boot ax belay
CONDITION	In a field environment, given a dynamic climbing rope and an ice ax.
STANDARD	Perform a boot ax belay IAW the NWTC Mountain Operations Manual.

Learning Step/Activity 1 - Boot -Axe Belay

a. The boot- axe belay (also called the New Zealand foot brake) is a fast and easy way to provide protection as a rope team moves up together. It cannot be expected to hold a high fall force. With thorough practice, you should be able to set up this belay in a couple of seconds with a jab of the ice ax and a quick sweep of the rope.

b. To perform the boot axe belay:

1. Stamp a firm platform in the snow, big enough for the ice axe and uphill boot.
2. Jam the ice- axe shaft as deeply as possible into the snow at the rear of the platform, the shaft tilted slightly uphill against a possible fall. Have the pick perpendicular to the fall line, thus applying the broadest side of the shaft against the force of a fall.
3. Stand below the ax, at approximately a right angle to the fall line and facing the side on which the climber's route lies.
4. Plant your uphill boot into the snow against the downhill side of the shaft, bracing it against a downward pull.

Plant the downhill boot in a firmly compacted step far enough below the other boot so that the downhill leg is straight, providing a stiff surface.

5. Flip the rope around the ax. The final configuration will have the rope running from the direction of potential load, across the toe of the uphill boot, around the uphill side of the ax, and then back across the boot above the instep.
6. Hold the rope with the downhill (braking) hand, applying extra friction by bringing the rope uphill behind the heel forming an S bend. The braking hand must NEVER leave the rope.

ELO G

ACTION	Perform a running belay
CONDITION	In a field environment, given an adequate area, a dynamic climbing rope, carabiners, sling material, and artificial protection
STANDARD	Perform a running belay IAW the NWTC Mountain Operations Manual.

Learning Step/Activity 1 - Running Belays

a. Running belays (also called simul-climbing) are used by rope teams on moderate terrain where the possibility of a fall is low but the consequences of a fall are high. Intermediate anchors are placed by the rope team leader and the followers leave the anchors in place for others on the rope to use. The entire rope team climbs simultaneously with the climbing rope moving freely through intermediate anchors. The anchors may be left in place for follow on rope teams or may be collected by the last member of the rope team.

b. The steps below outline a running belay:

1. The entire climbing team attaches themselves to the rope in the appropriate manner (see TSP M012 and M017)
2. The leader will begin moving forward, place an anchor, clip the rope to it and continue moving. The leader continues to place anchors and clip the rope to them where appropriate.
3. As the next rope team member get to the anchor, the team will need to stop to allow that team member to pass the anchor. To pass the anchor simply clip the rope behind the harness tie in point into the anchor and then remove the rope in front of the harness tie in point.
4. All rope team members continue to move and pass additional anchors as described above. Communication is required to start and stop movement of the rope team when emplacing, passing or removing anchors.

c. The entire rope team is ultimately moving at the same time. Keep in mind that if any climber on the team does fall, all team members will be affected. Climbers could be pulled down and climbers below could be pulled up. Periodically the entire team will need to stop to return anchor material to the leader.

ELO H

ACTION	Establish a belay for top rope climbing
CONDITION	In a field environment, given an established top rope climb, carabiners, sling material and artificial protection
STANDARD	Establish a belay for top rope climbing IAW the NWTC Mountain Operations Manual.

Learning Step/Activity 1 – Belay for top rope climbing

a. A top rope is a training aid that allows climbers to practice the movement techniques of climbing with a high margin of safety. The middle of the rope is clipped to an anchor at the top of a pitch to be climbed. The climber ties into one end with a re-threaded figure eight knot and the belayer manages the other end of the rope with a mechanical belay method. A hip/body belay is NEVER appropriate for a top rope climbing belay.

b. To establish a belay for this type of climbing:

1. Position and Stance should be below and off to the side of the established top-rope climb. The positon may be back away form the climb. Consider the direction of pull if the climber falls; the rope will pull the you (belayer) up towards the anchor point.
2. Establish a bombproof anchor using one of the methods described. Attach the carabiner from this anchor to your seat harness. Again consider the direction of pull if the climber falls. You must ensure that the anchor is in line with you and the direction of pull from the falling climber to prevent you from being pulled out of position and losing control of the belay.
3. Ensure the climber is tied in properly, is wearing a helmet, and is not wearing watches or rings. Remove slack between you and the climber and attach the mechanical belay.
4. Perform one more inspection or yourself and the climber and when you are satisfied, put the

belay on.

c. To manage the rope:

1. Using the rope commands, communicate with the climber. As the climber moves up the pitch take the slack out of the rope.

2. When the climber is stationary go to the brake position.

3. When the climber reaches the top-rope anchor, he will call “TENSION”. You should remove all slack from the system and go to the brake position. Sound off with “READY TO LOWER”

4. The climber will sound off with “LOWER”. Slowly release the brake to control the rate of descent of the climber and lower the climber to the ground.

5. When the climber is on the ground wait for the signal “OFF BELAY” from the climber before removing the belay.

ELO I

ACTION	Establish a belay for lead climbing
CONDITION	In a field environment, given an adequate area, carabiners, sling material and artificial protection
STANDARD	Establish a belay for lead climbing IAW the NWTC Mountain Operations Manual.

Learning Step/Activity 1 – Establish a belay for Lead Climbing

a. Lead Climbing. Earlier we discussed the fact that in roped climbing, one individual will lead up a climb and others will follow. Let us go back to the example we discussed earlier, where you were the lead climber and established a top belay to bring a second climber up a cliff face. You and your partner are now standing on a ledge, and you must now climb another section of rock to reach the top of the cliff. Again, one of you must lead and one of you will need to set up a belay for lead climbing.

b. This time your partner will do the leading, and you will need to establish a belay to protect him should he take a fall. Your partner wants to move over on the ledge a bit because he feels the climbing will be easier above that point. Your partner will be moving up the route, periodically establishing anchors and attaching the climbing rope to these anchors. The five steps to establishing a belay apply here as well. But there are some additional considerations for this type of belay:

1. Position and Stance. Once the climbing line is picked, the belayer selects his position. In this case the climber will be climbing above the belay position so it is best if the position is off to the side of the actual line, putting the belayer out of the direct path of a potential fall or any rocks kicked loose by the climber. The position should allow the belayer to maintain a comfortable, relaxed stance, as he could be in the position for a fairly long time. Look for belay positions close to bombproof natural anchors. The position must at least allow for solid artificial placements.

2. Aim the Belay. With the belay position selected, the belay must now be "aimed". The belayer figures out where the rope leading to the climber will run and which direction the force of a fall will likely come from. When a lead climber begins placing protection, the fall force on the belayer will be in some upward direction, and in line with the first protection placement. If this placement fails under load, the force on the belay could be straight down again. The belayer must aim his belay for all possible load directions, adjusting his position, or stance when necessary. The belay can be aimed through an anchor placement to immediately establish an upward pull, however, the belayer must always be prepared for the more severe downward fall force in the event intermediate protection placements fail.

3. Anchor the Belay. For a climbing belay to be considered bombproof, the belayer must be attached to a solid anchor(s) capable of withstanding the highest possible fall force. A solid natural anchor would be ideal, but more often the belayer will have to place pitons or chocks. A single artificial placement should never be considered adequate for anchoring a belay. Multiple anchor points capable of supporting both upward and downward pulls should be placed. The rule of thumb is to place 2 anchors for a downward pull, 1 anchor for an upward pull, as a MINIMUM. The purpose of the two anchors for downward pull is to keep the belayer from falling off the ledge and purpose of the anchor for upward pull is to keep the belayer in position should the lead climber fall. The following key points also apply to anchoring belays:

a. Each anchor must be placed in line with the direction of pull it is intended to support.

b. Each anchor attachment must be rigged "independently" so a failure of one will not shock load remaining placements or cause the belayer to be pulled out of position.

c. The attachment between the anchor and the belayer must be snug to support the stance. Both belayer's stance and belay anchors should absorb the force of a fall.

d. It is best for the anchors to be placed relatively close to the belayer with short attachments. If the climber has to be tied-off in an emergency, say after a severe fall, the belayer can attach a prusik to the climbing rope, reach back, and connect the sling to one of the anchors. The load can be placed on the prusik and the belayer can come out of the system to render help.

e. The belayer can use either a portion of the climbing rope or slings of the appropriate length to connect himself to the anchors. The rope is attached using either figure eight loops or clove hitches. Clove hitches have the advantage of being easily adjusted. If the belayer has to change his stance at some point, he can reach back with the guide hand and adjust the length of the attachment through the clove hitch as needed.

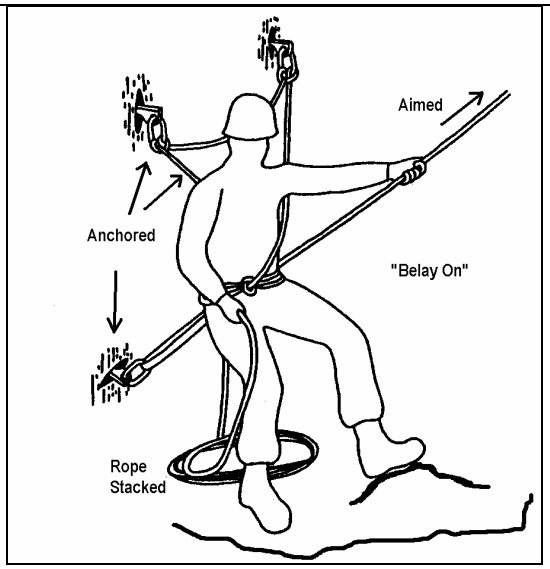
f. Arrangement of rope and sling attachments may vary according to the number and location of placements. Follow the guidelines set forth and remember the key points for belay anchors; in line and "snug". The figure below is an example of a common arrangement, attaching the rope to the 2 "downward" anchors and a sling to the "upward" anchor.

4. Stack the Rope. Once the belayer is anchored into position, he must stack the rope to ensure it is free of twists and tangles that might hinder rope management in the belay. The rope should be stacked on the ground, or on the ledge, where it will not get caught in cracks or nubbins as it is fed out to the climber. On small ledges, the rope can be stacked on top of the anchor attachments if there is no other place to lay it, but make sure to stack it carefully so it won't tangle with the anchored portion of the rope or other slings. The belayer must also ensure that the rope will not get tangled around his legs or other body parts as it "feeds" out. The rope should never be allowed to hang down over the ledge. If it gets caught in the rock below the position, the belayer may have to tie-off the climber and come out of the belay to free the rope; a very time consuming and unnecessary task. The final point to remember is the rope must be stacked "from the belayer's end" so the rope running to the climber comes off the "top" of the stacked pile.

5. Attach the Belay. The final step of the procedure is to attach the belay. With the rope properly stacked, the belayer takes the rope coming off the top of the pile, removes any slack between himself and the climber, and applies the actual belay technique.

The belayer should make one quick, final inspection of his belay. If the belay is set up correctly, the anchor attachments and the rope running to the climber will all be on the "guide hand" side, which is normally closest to the rock. If the climber takes a fall, the force, if any, should not have any negative effect on the belayer's involvement in the system. The brake hand is out away from the slope where it won't be jammed between the body and the rock. The guide hand can be placed on the rock to help support the stance when applying the brake.

When the belayer is satisfied with his position, he gives the signal, "*BELAY ON*!". When belaying the "second", the same procedure is used to set up the belay. Unless the belay is aimed for an upward pull, the fall force is of course downward and the belayer is usually facing away from the rock, the exception being a hanging *BELAY ON* a vertical face. If the rope runs straight down to the climber and the anchors are directly behind the position, the belayer may choose to brake with the hand he feels most comfortable with. Anchor attachments, guide carabiner, and rope running to the climber through



BELAY SETUP

c. Lead climbing, belays for lead climbing and rope management for lead climbing are discussed in more detail in M012, Roped Climbing.

ELO J

ACTION	Perform a belay escape
CONDITION	In a field environment, given an adequate area, a dynamic climbing rope, carabiners, sling material and artificial protection
STANDARD	Perform a belay escape IAW the NWTC Mountain Operations Manual.

Learning Step/Activity 1-**The Belay Escape**

a. Even with a good belay, a climber may take a fall and sustain an injury while climbing. In some situations, it may not be possible to lower the climber to the ground or to a safe area. In this case, you must tie-off the belay and get additional help to rescue the fallen climber.

b. To escape from the belay:

1. Tie a figure 8 loop in the rope below your brake hand. Clip a locking carabiner to it.
2. With your guide hand secure your 6ft cordallete. Secure it around the portion of the rope that goes directly to the climber with a prusik knot with at least three wraps.
3. Attach a carabiner to the other end of the cordallete and clip the carabineer to an anchor that will support the load of the fallen climber. You should be able to attach it to an anchor that you are using for the belay. You may need to extend the cordallete by girth hitching additional webbing or cord to it in order for it to reach the anchor.
4. Push the prusik knot as far up the rope as you can making it tight.
4. Slowly release your brake hand from the rope to ensure that the system will support the load.
5. Come out of the belay. Leave your pear shaped carabiner and belay device on the rope. Tie a figure eight loop below the prusik and clip the figure eight loop back into the anchor supporting the load of the climber. This backs up the prusik and will allow someone to quickly get back into the belay should this be required later.

SECTION IV **SUMMARY**

Check on Learning

a. Who is the only person that can give the rope command OFF BELAY.
The climber.

b. What are the five steps fundamental to establishing any belay?
Position and Stance, Aim, Anchor, Stack the rope and Attach the Belay.

c. What is the rule of thumb for anchors when establishing a belay for lead climbing?
You must use a minimum of 2 anchors for downward pull and 1 anchor for upward pull.

d. What is the purpose of the downward pull anchors and what is the purpose of the upward pull anchor?
The downward pull anchors keeps the belayer attached to the cliff face, ledge etc. The upward pull anchor keeps the belayer in position should the lead climber take a fall.

Review and Summarize Lesson

ACTION:	Demonstrate establishment of and execution of different types of belays utilized in roped climbing
CONDITION:	Given an area with suitable features for establishing a belay, adequate sling materials, carabineers, appropriate artificial protection and a dynamic climbing rope.
STANDARD:	Demonstrate establishment of and execution of different types of belays utilized in roped climbing IAW the NWTC Mountain Operations Manual.

Transition to next lesson

As per the NWTC training schedule; dependent upon the course in conduct

SECTION V	STUDENT EVALUATION
Testing Requirements	**Students will be tested on this task during the Mountain Stakes portion of training as per the NWTC training schedule for this course.**
Feedback Requirement	**Students will receive two opportunities to pass each event tested. Re-training will be conducted for students that fail the first iteration of testing. Refer to M020 for specifics.**